ABSTRACT OF THE DISCLOSURE

In manufacturing thinned semiconductor chips by grinding a semiconductor wafer supported on a rigid support substrate, in order to remove semiconductor wafer or semiconductor chips from the support substrate without damage to the semiconductor wafer or semiconductor chips, a semiconductor wafer at its surface is bonded on a light-transmissive support substrate through an adhesive layer having an adhesion force to reduce upon exposed to light radiation, thereby exposing the back surface of the semiconductor wafer. A tape is bonded to the backside of the semiconductor wafer integrated with the support substrate of after grinding, wherein the tape is supported at the periphery. Before or after bonding of the tape, light radiation is applied to the adhesive layer at a side close to the support substrate to reduce the adhesion force in the adhesion layer. Thereafter, the support substrate and adhesive layer is removed from the surface of the semiconductor wafer, leaving the semiconductor wafer held by the tape and frame. The semiconductor wafer supported by the tape and frame is cut at streets into individual semiconductor chips.